Introducing IT Cost Services Management in a small enterprise*

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Abstract

This paper shows a case study on the implementation of a financial management system related to IT services in a small enterprise whose core business is not IT-related. Process models (ITIL is the most popular) describe "what to do" but not "how to do". Moreover, small non-IT enterprises do not know the value of IT services provided by their providers, the value of the assets underlying the provisioning of those services, and the qualification of operational forecasting. Introducing Financial Management is the key to connect the business and IT and in this way, getting operational visibility, and insight and superior decision making. A case study, is presented describing the first steps given in order to introduce IT cost management, enhancing decision making and obtaining operational control

Keywords

Financial management, ITIL, non-IT small enterprise, IT costs, budgeting

1 Introduction

The last decades have seen a dramatic transformation in the use of computer technology: from early times of cable and costly data centers have been replaced by personal computers that are affordable even to the smallest enterprises. The current ubiquitous presence of computers in corporations seems to support the common believe that they facilitate productivity growth, moreover such relationship has been proven true independently of company's size or sector [1].

Therefore it is not surprising that investments in Information Technology (IT) are an ever increasing part of corporate expenditures. According to a survey of corporate United States, the majority of CEOs and CIOs consider IT as a strategic advantage and roughly 25%, out of 297 executives consulted, believe that IT investments should increase during economical downturn [2].

However, companies rank IT importance differently depending on their size and how technology relates to their core business. Some compelling information [3] regarding the use of IT in enterprises indicates that 13% of the consulted companies consider IT at the core of their businesses and invest aggressively on technology to stay ahead of competitors. Another 34% of enterprises consider IT an important investment albeit not being their core business - such companies tend to be of medium or small size. What is surprising is that more than half of the companies, that is 53%, were not assertively investing on IT - such companies tend to be large companies with stable computing infrastructure in which upgrades are likely to be complex and daunting activities.

Therefore it would be logical to assume that IT expenditures are under control; after all, they are essential to productivity growth and considered an important asset, especially to medium and small companies. Though, that is not what happens. According to Schneider [4], as much as 86% of north American senior financial executives reported that their IT spending is not under adequate control. That is alarming news to the corporate world; but it is especially alarming to small and medium enterprises, which account for 99% of all companies in Europe – equivalent to 23 million businesses [5]. The representativeness of small and medium enterprises in the United States is also similar to the European reality; there, an estimate shows that there exist roughly 21 million enterprises with 20 or fewer employees [6].

Furthermore, it is a common practice for accounting departments to include all IT infrastructure costs in their reports without making any kind of distinction from the rest of expenditures.

This management approach may not aid the understanding of the real costs associated to the different IT services, due to their complexities, and give a false impression to the internal or external clients with respect to price and quality. In fact, one of the main problems in identifying the costs of IT services is that - from a user point of view - they are considered as a tool for carrying out routine activities; such a frame of mind often leads to the use of technology without much thought to its adequate use. Ignoring that the use of IT services incurs in costs leads to users not to be concerned for the correct use of those services and they cannot objectively evaluate if the services are of the expected quality. Thus, possible end-user complaints will unlikely be clear and based on objective issues, which unfortunately also lead to a distancing between the enterprise's core business and the IT services provided.

How could costs be controlled and assigned to the IT services provided by the IT department? How could IT budgets be forecasted for a given period of time and aligned to the real needs of the business? How could IT investments be evaluated with regard to the achievement of their goals?

The aforementioned questions can be answered if enterprises achieve adequate levels of IT services management that also acknowledges financial aspects. This way, organizations can follow best practices process models as reference.

2 Research methodology

The research methodology for implementing financial management in non-IT small enterprises is composed of the following activities.

1) Review of process models with respect to their guidance on financial management.
2) Review of financial principles with regard to budgeting and accounting
3) Define the IT services (service catalogue) provided to non-IT enterprises
4) Assign the IT cost to the IT services defined previously for a period of time (usually annual), in terms of fixed costs and effort. In this way, the total costs and effort are calculated.
5) Define IT budget for next time period. The budget is calculated by departments or units in terms of costs and effort taking into account current period data. The infrastructure's age is taken into account also for forecasting the purchase of hardware in the new time period.

3 Process Models

The main process models related to IT are ITIL v3 (Information Technology Infrastructure Library version 3) [7-11] and CMM-SVC v1.2 [6]. The financial management of IT services is mentioned explicitly in ITIL, but not in CMMI-SVC. For this reason, only a general view of ITIL v3 is presented along with a more detailed description of the financial management of this model

3.1 ITIL v3

ITIL v3 is a collection of guidelines aimed at helping private business and government agencies to conduct IT services. The guidelines are maintained by many collaborators under supervision of the United Kingdom's Office of Government Commerce (OGC), which published the 3rd version of the standard composed of five publications: Service Strategy [7], Service Design [8], Service Transition [9], Service Operation [10] and Continual Service Improvement [11]. The Service Strategy volume provides guidance on how organizations can improve and develop their IT services relying in a market-driven approach. It is located at the core of the ITIL Lifecycle and it is the most relevant publication for financial management. It includes the following processes: Financial Management, Demand Management and Management of Services Portfolio.

ITIL v3 cites what activities have to be done in each process, though it does not explain how. A brief review of the volume Service Strategy is presented next because it contains the information most relevant to assess IT services finance in enterprises.

3.2 Additional Models

Conceptually, process models describe "what" has to be done, but not explicitly state "how" to achieve it. IT process models provide guidance on how services can be managed effectively throughout their life cycles - from conception to retirement - in a repeatable manner. However, financial management activities are left out of the main standard models to be implemented at business administrator's discretion; such characteristic provides an opportunity for further research on how financial management can be refined to improve process models. In this direction Table 1, compares the process models that have been reviewed and it presents the gaps in knowledge that this paper addresses.

Table 1 Comparison of Process Models regarding IT Financial Management

	Proposed framework	ITIL	CMMI/SVC	COBIT	eSCM-SP	eTOM	ISO 20000	ITSCMM	OPM3	PMBOK	PRINCE2
Provides guidance to assess IT financials?	◆	⊙	○	⊙	⊙	–	–	⊙	–	⊙	○
Provides guidance on identifying the Total Cost of Ownership of IT?	●	○	○	○	○	–	–	○	–	○	○
Suggests the use of techniques for Budgeting?	●	○	○	⊙	⊙	–	–	⊙	–	⊙	○
Financial guidance can be used in SME?	●	●	●	●	●	–	–	●	–	●	●
Defines IT cost factors?	●	○	○	○	○	–	–	○	–	○	○
Budgeting [illegible] not available											

4 *Financial Management*

The financial management process of IT services is implemented through three main activities: budget elaboration and control, accounting and billing (also known as charging) [12]. Next a brief description of each is provided

4.1 Budget Elaboration and Control

The goals to be achieved by budgeting are [7] [12]:

- Predict and estimate the money necessary to deliver the IT services during a predefined period,
- Ensure that the business has enough funds to cover the needs of the IT services,
- Ensure that the IT service level agreements can be delivered during the determined period,
- Ensure that the real expenses can be compared with the predicted expenses at any time,
- Allow for early warnings of excess or lack of resource use, and
- Ensure that income will be able to cover for the forecasted expenses - in cases where charging applies.

Among the many different methods used to draw up a budget, the most usual are [7] [12]:

- Zero-Based Budgeting: this type of budgeting does not take into account any historical data. It is needed to detail and explain all the outcomes, associating the expenses and costs with existing resources and services provided. It is a costly activity and it can be used a single time to define the first year's budget and then use the incremental Budgeting technique for following years, and
- Incremental Budgeting – consists of using the previous year budget and modifying it according to the expenses forecasted by the IT department and the business management.

Once a method for budget implementation has been chosen, it is necessary to define the categorization for each cost element (associated to each service); this service categorization should be maintained over time to allow for follow-ups in future budget periods. Among the categories to be defined, it is needed to take into account all future costs that can be forecasted as well as existing contracts (i.e. internet connection), real state rent, and staff salary, among others. Moreover, as much as posible, it is also needed to estimate all the known costs based on previous periods (i.e. overtime worked by the engineer in the previous fiscal year)

[1] Means that some information is available, albeit not necessarily detailed or comprehensive

4.2 Accounting

The most relevant goals of this activity are [7] [12]:

- Assess the money spent providing IT services and compare it with the forecasted budget,
- Identify and categorize the different cost elements (associated to services),
- Calculate the costs incurred by providing the different IT services to both internal or external clients,
- Aid the business decisions based on the costs of IT services,
- Identify the costs associated to changes. Make daily decisions with full understanding of the implication regarding costs and risks,
- Offer detailed information regarding the sources of IT service expenses,
- Define an adequate profit strategy for acknowledging the benefits and costs provided by the use of technology and identify different working scenarios, and
- Perform a cost analysis and Return on Investment (ROI).

From the business point of view, the approach and definition of accounting and charging should consider the IT infrastructure strategy.

As it has been discussed, among the main goals of accounting, it can be highlighted the tasks of defining the elements of cost and their association to IT services provided.

Once the complete structure of the services has all costs associated by element, it is possible to determine the costs per service. Having this information, and depending on the accounting method defined by managers, it is possible to define the prices of IT services and finally to realize the billing of attribution of costs.

The main goal to apply an efficient cost control is to take into account their nature and to be able to assign, to each element of the IT infrastructure, the corresponding costs, following the definition of cost model defined by the enterprise.

4.3 Billing or Cost Attribution

The fact that the organization of IT implements a billing process or attribution of charges depends entirely on a business decision, according to its strategy and operation. If senior management decides that the organization of IT services should function as an independent business unit, receiving its full support, it would be posible to implement billing activities to:

- Recover all costs of the IT services provided, in a fair and accurate manner, from the customers that use such services, and
- Influence the behavior of customers and users, making them aware of the cost associated to the IT services provided by the organization and encouraging them to make a good use of such services.

A billing or charging process should have the following characteristics [7] [12]:

- Simple. The benefit of implementing the billing should begin with simple procedures, not complex ones. The complexity can lead to distort the current roles defined in the organization, prioritizing more administrative tasks that those of IT,
- Fair. There should be a balance between cost and charge, which will help in the search for efficiency, and

- Realize that the must never be a goal of the strategy of the business. If the business loses, the IT organization's activities must not be inefficient and a drag for the business or the company runs the risk of becoming less competitive.

Moreover, there are certain factors that should govern the requirements for charging policies to be implemented:

- Determine the required level of return from expenditures. If the organization of IT chooses to recover all costs, it may choose to function as an autonomous unit,
- Determine the desired degree of influence on the behavior of customers and users; this should promote more efficient use of resources without making the business less competitive, and
- Design the policy of charges to facilitate the recovery of the costs on the basis of use.

5 *Case Study*

THE COMPANY 91 SL (fictitious name for confidentiality reasons) is an organization with headquarters in Madrid founded in 1991. It currently employs 17 staff members and is organized around the following departments.

- Department of Accounting and Finance (DAF); is responsible for providing fiscal consultancy and the accounting of the company's clients, as well as its own accounting.
- Department of Labor (DL): is responsible for carrying out payrolls, TCs, update the Social Security status of the company's clients, as well as all the activities related to its own human resources.
- Department of Mortgage Management (DMM): is responsible for everything related to the management of real state certificates, deeds and processing of inheritance of the company's clients,
- Department of Legal (DC): is responsible for carrying out legal advices, issuing criminal certificates, wills, and everything related to the efforts related to the Division of Motor Vehicles (as, for example, renewal of a driving license)
- Department of IT (DIT): responsible for providing support to the rest of departments. In addition it is also responsible for ensuring compliance to ISO Quality 9000 and LOPD (Organic Law of Data Protection)

With respect to the infrastructure, THE COMPANY has a midrange server for hosting data and applications, 16 personal computers and 2 laser printers (all connected through the internal LAN). Each department only can have access (through licenses) to the applications needed for performing their daily work which are installed in the server. There are 4 matrix printers needed for printing official documents. Table 2 summarizes the infrastructure of the company.

The company also maintains a web site that provides all the services of the company, on the company's web page. The web site is hosted at a third-party ISP server, which also provides storage and security services.

Table 2. Infrastructure of the company by department

Departments	Accounting	Labor	Legal	Mortgage	DIT
Specific Applications (number of licenses)	Contab (6)	Lab (5)	GestorC In-house (4), Traffic (4)	GestorM In-house (3)	
Number of PCs (oldness)	5 (3-2006, 1-2007, 1-2008)	4 (1-2007, 2-2008, 1-2009)	4 (1-2005, 1-2006, 1-2007, 1-2008)	3 (1-2007, 1-2008, 1-2009)	
Number of Laptops (oldness)	1-2008	1-2009			1 (2007)
Matrix Printers	1		2	1	
Base Applications	Microsoft 2000, Office 2003				

5.1 IT Services

The Department of IT consists of a single person (an engineer in computer science). The engineer is responsible for maintaining the infrastructure of the company, as well as solving the incidents and problems of the users of both staff and web users. So, the Department of IT provides the following services to the rest of departments of the company (see Table 3).

Table 3. Infrastructure of the company by department

Category	Services
HARDWARE	Installation (HI), Updating (HU), Maintenance (HM)
OPERATING SYSTEM	Installation (i.e Windows, Linux) (OSI), Updating (OSU), Maintenance (OSM)
BROWSER	Installation (i.e. Internet Explorer, Firefox) (BI), Updating (BU), Maintenance (BM)
DEPARTMENT SPECIFIC SOFTWARE	Installation (DSSI), Updating (DSSU), Maintenance (DSSM)
COMMON SOFTWARE	Installation (i.e. Microsoft Office, printer drivers) (CSI), Updating (CSU), Maintenance (CSM)
E-MAIL CLIENT	Installation (i.e. Microsoft Outlook) (ECI), Updating (ECU), Maintenance (ECM)
TELECOMMUNICATIONS INFRASTRUCTURE	Maintenance (monitoring of the external provider services), as well as the functioning of the broadband internet connection (TIM)
WEB SITE	Maintenance (WSM), Backup (WSB)
BACK UP	Backup of the company data hosted in the main server (BD)
QUALITY MANAGAMENT	Inspection and maintenance of quality attributes, including ISO and LOPD guidelines (QM)

The difference between updating and maintaining services lies in the fact that the updating installs new versions of the services, while the maintenance refers to resolution of issues.

5.2 Financial Management of IT Services

The company currently works in an ad-hoc manner with regard to IT and only accounts for the overall costs of the different services and the staff of IT; also, it has no control of IT costs per department. Therefore, in the next sections the accounting of IT for the year 2009 is carried out, and based on it, an incremental budget is proposed for the year 2010.

5.2.1 IT Costs, Financial Year 2009

In 2009, the total costs incurred by the company with regard to IT were of €53,010.42 out of which €12,210.42 was related to payments to third-parties and €42,000 was related to the salary of IT staff. Facilities rent for external services such as electricity or water bills were not included in these figures.

Table 4 shows the costs of external service providers by each of the IT services during the year 2009. The column Service indicates the service in question, the column Provider indicates the name of the external supplier (fictitious name) of the service, the column Fixed Costs indicates the corresponding fixed costs for the payments to external suppliers, the column Effort indicates the effort in hours devoted by IT staff to carry out a given activity (it is the effort by the engineer of the IT Department to carry out updating and maintenance of relevant services).

In the case of installation costs, the only costs taken into account were the ones related to the 2 computers bought in 2009.

The efforts of the IT staff were estimated, because there is not an institutionalized practice of reporting worked hours.

Table 4. IT Costs, FY 2009

Services	Provider	Fixed Costs	Effort
HI	FD	€1,200.00	
HU	FD	€255.62	2 h
HM			30 h
OSI			
OSU	Microsoft		120 h

Literature

1. E. Brynjolfsson and L. M. Hitt, Computing Productivity: Firm-Level Evidence, Cambridge, MA: MIT Sloan School of Management, (2000).
2. L. Cosgrove and J. a. E. Niemann, Findings from CXO's IT Spending and Lessons Learned Survey, in CIO Magazine, 2001.
3. K. Huang, Towards An Information Technology Infrastructure Cost Model, in Center for Technology, Policy, and Industrial Development, vol. Master of Science in Engineering and Management Cambridge, Massachusetts: Massachusetts Institute of Technology, (2007).
4. C. Schneider, IT: Hold on to Your Wallet!, in CFO Magazine, (2000).
5. Commission Recommendation 2003/361/EC, Official Journal of the European Unit, (2003).
6. CMMI Product Team, CMMI for Services, Version 1.2, Carnegie Mellon University CMU/SEI-2009-TR-001, ESC-TR-2009-001.
7. Office of Government Commerce, Service Strategy, TSO, (2007).
8. Office of Government Commerce, Service Design, TSO, (2007).
9. Office of Government Commerce, Service Transition, TSO, (2007).
10. Office of Government Commerce, Service Operation, TSO, (2007).
11. Office of Government Commerce, Continual Service Improvement, TSO, (2007).
12. Office of Government Commerce, Service Delivery, TSO (2004)

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He has attained a BSc in Computer Science in Brazil at the Pontificia Universidade Católica do RS (PUCRS). The nightly lectures of his undergraduate course allowed him to work during the day for major multinational companies such as Hewlett-Packard and Telefónica where he exercised his skills as a software developer and tech leader. He has further enhanced his technical abilities attaining a number of certifications, namely SCEA (Sun Certified Enterprise Architect), OCUP (OMG Certified UML Professional), SCWCD (Sun Certified Web Component Developer) and SCJP (Sun Certified Java Programmer). Currently Filipe Albero Pomar is finishing his graduate studies of MSc in Software Engineering at the Universidad Politecnica de Madrid. Filipe can be reached by e-mail at the following address filipe.albero.pomar@alumnos.upm.es.

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